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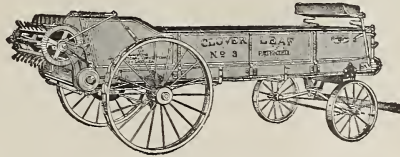
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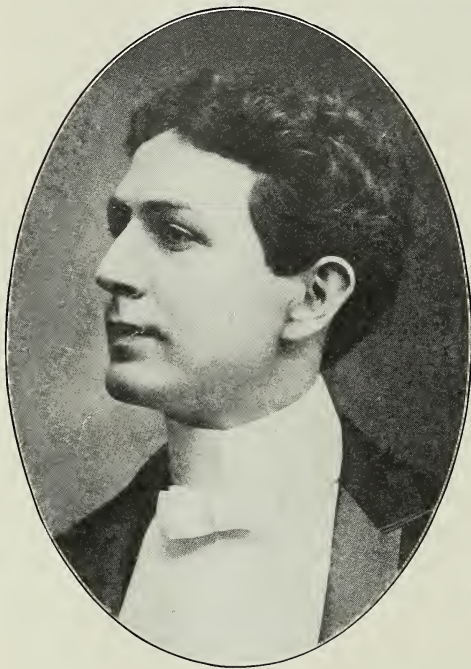
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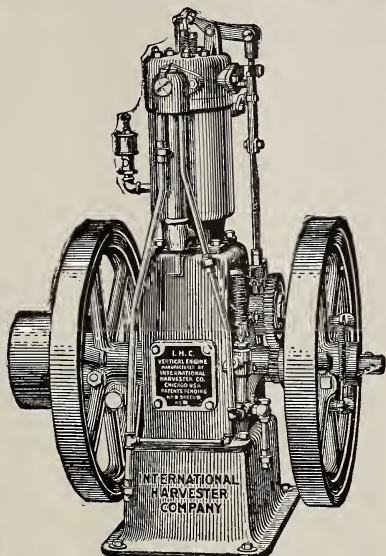
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No. 8

THE FARMERS' ORCHARD AND GARDEN

By Prof. V. H. Davis, Ohio State University

Fruit growing in the United States is clearly divided into two divisions or kinds—commercial and home. The ideals and problems in each case are, for the most part, entirely different. The commercial fruit grower carefully selects his location with reference to climate, soil, exposure, markets, etc. The home fruit grower finds these problems already settled, in great part at least, by the location of the home. In one case the location is selected where all the conditions that make for success are as nearly ideal as possible. In the other, conditions must be accepted as they are found and the best made of them. The commercial fruit grower grows the things he can sell best, the things the other fellow wants. The home fruit grower attempts or should attempt to grow the things his family likes, regardless of the other fellows' tastes. Thus it is that the home grower will plant Yellow Bellflower apples and Bartlett pears, while the commercial grower may find it much more profitable to grow Ben Davis apples and Keiffer pears. In one case the orchard is the chief, if not the sole, source of income. In the other it is wholly secondary to the other farm crops, and it is expected to give little or no money income.

A very few years ago practically all the fruit in Ohio was grown in the farm or home orchards. In the last census

report (1899) there were only six counties in the state that did not report over 100,000 bushels of apples. Yet the strictly commercial orchards of the state could probably have been counted upon the fingers of the two hands. Over 90 per cent. of the 20,000,000 bushels produced in the state in 1899 doubtless came from the farm orchards. But we have only to look about us everywhere to realize that the farm orchard is rapidly passing away and that in all probability it will never again be credited with such a high percentage of any given year's crop.

The reason for the decline of the home orchard is easily found and easily explained. Planted as a secondary crop, with little thought of revenue, they receive little or no care save an occasional pruning and the gathering of the fruit, at first secured with some regularity and in fair quality and quantity, but as the years went by insects and diseases imported from other countries and transferred from our own forests to the orchards, made the crops more and more uncertain and the quality more certain to be poor. The difficulties of fighting these enemies of a crop looked upon as a secondary crop at best in most cases has proved too burdensome for the farmer, and he has given it up as a hopeless task.

While it is hardly the purpose of my

talk to discuss remedies for the various enemies of fruit plants, I do want to say that these enemies can be successfully combatted. There is not a single fruit common to this latitude that is not grown in Ohio successfully in a commercial way in spite of insects and diseases. And the same methods are available to the home grower as to the expert. With the general dissemination of knowledge along these lines by the experiment stations and agricultural press, there is no excuse for anyone not knowing how to control these enemies, if they really desire to do so, and securing an abundant supply of all kinds of fruit for home use.

Furthermore, the loss of the farm orchard and small fruit plantation must be looked upon as one of the calamities of farm life. While it was not considered by the late Country Life Commission, it should have been, for I verily believe that the farm orchard and vegetable garden mean, or can be made to mean, more in the way of health, pleasure and profit to all the members of the family than almost any other adjunct of the home. A country home can never be an ideal home unless all the fruits and vegetables common to the locality are produced in their season upon the farm.

The harmful effects of a diet largely devoid of fresh fruits and vegetables are too well understood to need further comment. Without the cooling and stimulating effect of these articles the blood becomes sluggish and laden with impurities. Scrofula, dyspepsia and other similar diseases rapidly increase, and the venders of patent medicines grow rich in consequence. Oh, but someone says, it is cheaper for me to devote my time and energy to my farm crops and buy the fruits and vegetables necessary for my family. That may be true in some cases, but I doubt it. When such a plan is cheaper, it is very likely to mean that

the purchases are very few and far between and the quantity correspondingly scant.

The greatest luxuries of the home orchard and garden are not to be bought with money. The gratification of watching our plans mature, the plants growing and developing, and later the gathering of fresh ripe apples, peaches, plums, grapes, strawberries, etc.—not the stale, half rotted fruit of the market stand—crisp radishes, asparagus, lettuce—not the wilted stuff of the dealer—tomatoes, cucumbers, melons, peas, beans, still cool with the morning dew. And, last, but not least, the satisfaction that enemies have been met and overcome, that you are the victor and the bugs have been vanquished. These are the greatest luxuries of the home orchard and garden, and their value cannot be measured in terms of money.

It is a lamentable fact, which I believe to be true, that the city man's table is better supplied with fruits and vegetables than is that of the countryman of equal financial standing. Pork, potatoes, bread, pies and cake, with little variation even through the summer months, form the chief articles of food in thousands of country homes, and the family, especially the children, are deprived of their rightful heritage, the things that their appetites crave most—fresh fruits and vegetables. Honestly, now, did you ever eat any apples, pears, strawberries or grapes bought out of a basket or box that ever tasted half so good as those you gathered by the hatfull as a boy or girl from the old farm orchard, garden and arbor? Or, perhaps, the *very best* ones came from a neighbor's orchard or garden.

I believe I am safe in saying that the most pleasant memories of our boyhood and girlhood days upon the farm are inseparably associated with the fruits and

vegetables of the old orchard and garden. Are we going to willfully and needlessly deprive our children of these pleasures, these associations, these memories? You are all familiar with the old saying that the best way to a man's heart is through his stomach. If it be true with the man, how much more so of the growing boys and girls. But be this as it may, assuming fair and just treatment otherwise, I firmly believe that nothing will help to keep the country boys and girls content with rural life and make them appreciate the great natural advantages of their situation as will a good home orchard and garden and a bountiful supply of good fruits and vegetables, and the man who wilfully and needlessly deprives his family of these necessities fails in one of his first duties as a husband and father.

From the standpoint of profit alone, the farm orchard and garden deserve our special consideration. The amount of fruit that can be grown upon an acre of land well tilled and well cared for is almost incredible, and with the number of kinds that may be grown, ripening at different seasons, in connection with the various methods of storing and preserving, there need not be a single meal almost, if not quite, the entire year round that cannot be made more palatable, more healthful and withal more cheerful by the presence of some dish from the orchard and garden. A single tree of apples may often produce enough fruit for an average family the entire year. A Wells tree on the Experiment

Station farm 40 years old and unfruitful for a number of years produced about 30 bushels of good quality the first season after being thoroughly pruned and sprayed. During the last season a Stark tree about 50 years old with which I am acquainted produced 30 bushels of sorted apples, and a few years ago I knew a Baldwin tree about 45 years old that produced 40 bushels of sorted apples. Twenty-four Lombard plum trees 10 years in our orchard last year averaged over six bushels each the fruit selling for \$1.25 to \$1.50 per bushel. Rest assured, then, that aside from the health and pleasure, the are devoted to the orchard and small fruits, if well cared for, will yield many times over the profit that can be secured from a similar area devoted to the ordinary farm crops. It is hard to see why the farm orchard and the garden are so generally neglected, when proper care will yield such enormous profits.

The area required for the production of fruit for the use of the average family need not be large, if good care is given. One acre devoted to the orchard and vine fruits in approximately the following number will give ample variety and quantity: Twelve apples, six each of the pear, plum, peach, sour cherry, sweet cherry, quince and grape, 300 strawberry plants, twenty-five each of black and red raspberries, twenty-five blackberries, twelve currants and twelve gooseberries.

DRAFT HORSES ON THE FARM

J. V. Hyatt, '05

Now, when draft horses are in such great demand, farmers in all sections are giving the question of their production quite a little thought, and rightly so. Drafters the whole country over are selling at wholly unprecedented prices, and the demand is away ahead of the supply. Buyers are scouring the producing sections with energy, and most of them complain, not of the high prices demanded, but of the absolute scarcity of good individuals. Pick up any farm paper, and this will be one of its most striking features; and start out yourself to buy a pair of good ones and you will be most forcibly convinced that we have not nearly enough of the kind we want. Then why not breed a few on your own farm?

If you have a large farm, by all means raise drafters; if a small one, you will also find it profitable. Keep enough good big mares to do all of your work, and keep them at the same time raising colts. These may very profitably be sold at weaning time if you are not fixed to keep them to maturity. In fact, of recent years good stocky weanlings have been at such high prices that the general farmer is hardly warranted in keeping them to marketable age. But, whatever plan you follow, be sure of this: If you produce good ones, you will be well paid for your investment and trouble. That last is an unsuitable word, for raising these colts will be found more of a pleasure than trouble.

The farmer making a business of breeding draft horses always has plenty of teams to do his work. The mares can safely be worked the greater part of the year, thus paying well for their keeping; the stallion, if one is kept on the place,

should be worked except in the breeding season; and the young things from three years old until of marketable age—about five—may, by proper care, be made to pay their way. The cost of producing the market gelding, then, may be placed at the cost of the three-year-old colt. And these colts take very little special care in breaking or working. They are always ready for the heaviest load, will take the plow along at a good, strong gait, and, with very few exceptions, are at all times safe and pleasant to handle. And this working about the farm is all the breaking or training they need in preparation for market.

Fitting for market is also a comparatively easy matter, requiring only plenty of feed of the right sort, careful grooming and just sufficient exercise to keep up the best of tone and spirit. The time required for this is usually short, not often more than ninety or a hundred days after taking from hard work. In fact, if properly worked and cared for, ready sale may be found with little or even no special fitting, although I think it will pay well to have them in the very pink of condition as ordinarily considered by the buyer. This fitting is usually to be done during the slack of winter, so any extra time spent in grooming will not be missed. However, the demand for drafters is more general throughout the year than with the other types of horse, and, if it should be necessary, they may be sold at almost any season at practically full value.

In any line of live stock breeding many culls or misfits are certain to appear, the successful disposal of which may often mean the difference between a profit or a loss, and here again the

breeder of draft horses has it over his neighbor in the harness horse business. The misfit drafter is usually one that for some reason or other has failed to attain the required size, or else those that have been blemished. These all find a more or less ready sale—the undersized ones for farming, express, transfer or other city use, and those that are badly blemished go to the rougher kinds of heavy hauling, as road grading, coal hauling, etc. But it takes quite a bad blemish or hurt to disqualify for the better market, and, on the other hand, because of their quiet disposition drafters are much less liable to injury than the smaller types. Considering their strong demand at good prices, the comparative ease of raising them and the many other advantages they possess, it seems plain that the drafter is the horse for the farmer and that he should not only breed enough to keep himself supplied with teams, but should have one or more to sell every year.

But, you will say, this or that fellow failed at just this sort of thing. Quite likely. And why? Perhaps they bred their mares to that grade nondescript of Smith's, or maybe to the one that is so slabsided and crooked legged, but happens to be a pure bred? Were there no good, sound, well bred stallions in the neighborhood? Yes, Jones had one or two, but he stood them at \$20, while Smith only charged \$10—or was it \$8? So these mares were bred to the mongrel stallion to save a paltry \$10 or so, while the produce of such a mating would in all probability be worth from \$40 to \$100 less than if the mares had been bred to the good horse. Or, maybe the fault was not in breeding, but in feeding. It takes plenty of good feed to make draft horses, and any check or stunting in their growth will take quite a few dollars out of the breeder's pocket. Breed right, feed right, and then watch the buyers hustling for them.



THE ROLE PLAYED BY SELECTION IN THE IMPROVEMENT OF LIVE STOCK

By V. E. Brubaker, '11

The variety of uses to which domesticated animals have been put, the food upon which they have subsided, the climate in which they have been reared, and selection for especial uses, have produced wide variations, which are now so apparent.

It may be noticed, that even the influence of nature alone, in some cases aided and in others counteracted by effects of man, has constantly been at work breaking up the uniformity of the original type, until divergence from the original, proved to be wonderful.

The influence of selection, for a good example, in creating divergence from a type singularly uniform, finds a most striking illustration in the case of domestic pigeons, of which there are now 300 known varieties and all probably descended from the wild pigeon. In practical business of breeding domesticated animals, it is important that due prominence be given to the operation of the laws of climatic condition. For it follows that a race or breed most perfectly adapted to a certain locality, a certain mode of life and condition of climate, may in time change all its distinguished characteristics and become perfectly worthless and vice versa.

In connection with this subject, I think heredity should be considered. The influence of heredity is always present in reproduction of animal life, and never fails to assert itself in a greater or less degree.

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it as a matter of course that the offsprings produced should possess general characteristics of the Essex breed; but, if having selected our breeding pair with view to transmission of a peculiar form of head and ear, we would find in the progeny few, if any, possessing the peculiarity we have sought for, and are apt to lose faith in the power of heredity. All these factors tend to make a breeder of live stock change or stick with his views of breeding. Also this leads the breeder to take advantage of the almost numberless shades of divergences from the original type to be found among the different species of domestic animals. Along with the aid of heredity, he produces wonderful transformation by selecting such individuals as most nearly conform to his ideal and those which manifest a tendency to assume the desired form. Therefore, by complying such an individual, he looks forward to the offspring, which he expects to be more prominent than the parent.

The individual farmer will select that breed for which he has the greatest desire and will attempt to produce stock best adapted for his use on the farm; also such as will conform to the best market class.

For instance, the Southdown, which was chosen by Creaders, who bred and fed them through many years, with special reference to improvement in quality and flavor of flesh, which afterwards made them very near the ideal of a meat

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mestic animals, the sheep is perhaps the most plastic in the hands of the skillful breeder. A well known illustration thus attained in the pure breed was shown in the two flocks of Leicester sheep bred by Messrs. Boeckly and Burgess. Each flock was kept pure for about a half century, and at the end of this time each had assumed quite a different appearance from that of the other. Nevertheless, both flocks were pure bred Leicester and could not be mistaken for any other breed. Another remarkable instance of selection affecting a thorough change of appearance and character of a breed was shown in a Tasmanian merino flock during the last twenty years. The old type of Tasmanian sheep had a body covered with heavy folds, with moderate sized folds on the neck. They are bred entirely different at the present time, because the ram buyers of the mainland do not like the heavy folds on the neck and such wrinkly bodies.

One of our best and most common breeds of swine, the Poland China, was and is at the present time being bred by careful selection of individuals for purpose of producing to a greater degree fine bone and a better quality of meat. Yet breeders have found an error in carrying out the fineness of bone to a much greater degree than is really desirable for this heavy meat producing animal. It causes a weakness of limb and be-

comes a detriment to breeders as well as market dealers. But this can only be restored by careful selection of sires. In the very earliest improvement of our domestic animals the breeders selected with much skill and bred in-and-in, which is a good thing to practice if the individuals selected are of the very best quality and have strong and vigorous constitutions. We find this, of course, to be almost impossible to be accomplished by the common class of farmers, as they have not the money to invest in such high priced stock.

Although I believe the farmers of today and those of the next generation will take advantage in live stock breeding of reasoning out the power of selection, they will do this not merely for the betterment of their own animals, but because they are using more science as the population and demands of this country increase, as well as to show their love for high class stock.

Increased population, greater demands and decrease of estate of each farmer means increase in number of breeders and that stock raising is fast becoming more scientific.

In conclusion we may say that live stock breeding will be successfully accomplished when our breeders have the most scientific modes of selection under their control.

BETTER LIVE STOCK

By M. A. Bachtell, '11

As one is whirled rapidly through a rural district on a passenger train one cannot fail to be impressed with the endless variations which the various farms present. Invariably a mental picture of the man who owns the farm presents itself to the observer as he passes by. This man is set down as slack and shiftless; that one as ambitious and prosperous, according as the appearance of his buildings, the cleanliness of his yards and the condition of his stock indicate. The prosperous man invariably has well bred stock. Some may argue that it is because he is prosperous that he is able to afford such stock, but I think that the proposition can be turned around and the possession of well bred stock be made one of the stepping stones to his prosperity. He saw years ago what many of his neighbors are just beginning to realize—that the better the quality of stock the more valuable it is both economically and in the gratification of a personal pride.

The idea that the grade or cross-bred sire has a place in American stock raising is a fallacy that the breeder, whether young or old, should get over as quickly as possible. A plea can be made for the grade female, especially if she is a good grade, for she is needed and in many cases is well filling the place she today occupies. A herd of fine pure bred females would be expensive, and for the breeder who caters simply to the open market perhaps an unprofitable investment. A good grade may be better than a poor pure bred animal, and when bred to a good pure bred sire will produce offspring that are nearly the equal of pure bred animals. Many farmers, realizing this, are apt to use some cross bred sire

simply because he is cheaper. This is wrong. A pure bred and a cross bred sire can well be compared to two ropes, one strong and with all its strands intact, representing the pure bred animal; the other frayed and weakened, representing the cross bred one. A pure bred sire represents years of breeding for a definite purpose. Consequently, it is not sufficient that he be selected simply because he is a good individual or turned down because his appearance is not just what it should be. One should go back and investigate his ancestors to see if they were all good individuals and of similar type. There is a law of breeding, short but terse, and it is that like begets like or the likeness of some ancestor. Consequently, a sire will transmit vigor, fertility and longevity in proportion as he receives them from his ancestors. An animal may have the best of pedigree, but his environment during his growing period may have been such that he reached maturity lacking the beauty and finish which he should possess. Such a sire undoubtedly has a good pedigree and might produce splendid offspring, but a good breeder would be wary about using such an animal. Another animal is a splendid individual, but his condition is due to environment rather than to his ancestors, some of which were of poor stock. Such a sire should never be used unless absolutely necessary, and today it does not seem to be necessary. Having satisfied one's self that the individuality and breeding of an animal is all right, it would still be unwise to purchase it and put it at once at the head of a valuable herd. It might fail to mate successfully with the herd females. Rather should he be mated with a few females of

known worth, so that his ability to improve the herd may be forecasted by the offspring.

Many farmers realize the value of having pure bred animals, but still they hang back either through timidity or on account of pecuniary reasons and continue to breed common stock. Some say, "Is it not better to continue to breed common stock until I can make enough money to buy pedigreed animals, rather than to go in debt in order to buy them at once?" By expressing a desire to have better stock they virtually admit that the common stock is not profitable. How, then, can they expect to make enough money from them to buy the better class of animals? Besides, one with the true breeder's instinct would not want to spend several years working

with inferior stock, a practice conducive to no large gains.

Grading is a form of breeding open to nearly all farmers. It consists in building up the home stock by the use of pure bred sires. In six generations of stock practically a pure bred herd can be established, although the animals will never be eligible to registry. In-breeding and line-breeding may be used to secure quicker results. Line-breeding consists in the selection and mating of animals from a single line of descent. In-breeding is the mating of animals identical in 50 per cent. or more of their blood. There are three favorite crosses in in-breeding—namely, sire and daughter, mother and son and brother and sister. Inbreeding rapidly intensifies whatever quality is in the blood. If that is good,



TWO FARM PETS

the results will be good; if it contains some weak points, dire effects may follow. It should be left alone unless it can be skillfully handled. Another system is to breed the best to the best, regardless of whether they are related or not.

Breeding is a science and one that calls for a large amount of good judgment. The breeder who simply realizes that a sire breeds well insofar as he is himself well bred and vigorous and selects accordingly is following the same laws as his more scientific brother who has a more extended knowledge of the

laws of nature, but he is working in the dark. Every stock raiser can be practical, if not scientific. Just a smattering of science is often dangerous anyhow. Breed the best to the best. Have an ideal in mind and breed for it. Do not be led astray by fancy points which a temporary market demands, but be on the watch for any real improvement in your chosen breed. All cannot be Booths or Cruickshanks, but all can work together for the betterment of the live stock of a community and indirectly for greater prosperity.

BITTER ROT OF THE APPLE

By W. R. Clum, '10

Bitter rot of apples has been known since 1856 by a variety of names and on various of our common fruits. It was first discovered in 1854 on the grape, and two years later was found on the apple. Again, in 1859, it was found on peaches and nectarines. All of these were discovered in England by Rev. M. J. Berkely, and, being found on different fruits, were thought to be different species of fungus, and consequently they were given different names, even though a resemblance was noted. Later investigations, however, indicated that they were all one species.

Rev. M. A. Curtis was the first to find this fungus in the United States. He described it in 1876 in North Carolina. In 1874 it was described by Curtis and Berkely under the name of *Gloesporium versicolor*. Little was done, however, until 1887, when Galloway treated it from an economical standpoint. By that time the bitter rot had appeared in many states from the Atlantic coast to Kansas, and the de-

struction of crops became so large that numerous mycologists began studying it as an economic disease.

The geographical distribution of this fungus is almost worldwide, being found wherever the apple will grow. In the United States it is found especially destructive northeast of and including part of Kansas, Oklahoma and Texas, the heavily infected region reaching the Atlantic in the region of the Virginias.

The bitter rot fungus is by no means limited to the apple, being proven by Halsted to occur as well on the grape, peach, pear, pepper, tomato, eggplant, banana, quince, lemon and bean. Allwood, in 1894, stated that all pomaceous fruits were attacked by *Goesporium fructigenum*, and in 1902 it was grown successfully on the squash.

The bitter rot closely resembles the brown rot in general appearance, but can be distinguished from it by the dark or nearly black specks or pustules which form in the center of the infected area, and by the fact that, in

mummified fruit, the mycelium seldom destroys the entire substance of the fruit, as does the brown rot. Also, that the infected area is sharply defined from the united area in bitter rot, while one area merges gradually into the other in brown rot.

Bitter rot—or ripe rot, as the name signifies—appears on the apple only as it is approaching maturity. It is found from July to September. Green fruit is found to be practically immune from the disease, probably on account of the large amount of malic acid found in green fruit, but which disappears as the fruit ripens. The factors which determine the time of appearance are probably (1) the age of the fruit, (2) the temperature and humidity of the air, (3) the presence of spore distributing centers.

Warm, sultry weather, particularly after a rain, forms the ideal condition for the development of the bitter rot. In cool, dry summers the bitter rot is usually present but sparingly. It is essentially a hot weather disease. An average temperature of 90°, with high humidity for a few days, is sometimes accompanied by an almost total destruction of the crop. Nights with a heavy fall of dew, alternating with hot days, are usually followed by an extensive development of the disease. Numerous cases are on record of the entire destruction of a crop in from three to seven days.

The first signs of the bitter rot appear in the form of a very faint light brown discoloration under the skin of the apple, usually on the smooth, unbroken surface of the fruit. The epidermis of the diseased area becomes light brown in color, with sharply defined borders of a darker hue, which become darker as it grows older. When the spot is one-eighth of an inch in

diameter, the area appears slightly sunken, and the epidermis appears to be thin and papery, but shows no trace of external injury. When about one-half inch in diameter, small black spots (the fruiting pustules) appear at more or less regular intervals beneath the epidermis in the sunken area. These increase in size and project in tiny raised points. Soon the epidermis of the fruit breaks through, and a large number of spores escape. These spores, when not washed from the fruit, form pinkish, flesh colored, sticky masses when moist. On quiet, dry nights the spores are discharged in long tendril-like threads, oozing out slowly from the mouth of the pustule.

The pustules are arranged in concentric rings around the point of infection, the rings being more perfect when the fungus develops rapidly. The pinkish appearance of diseased fruit is due to the spores which exude from the pustules. After a rainstorm the interior of the pustule looks sooty black and the mouth ragged, all of the spores having been washed off.

The spores, from whatever source or condition, are characteristically a delicate pale green, with hyaline cell walls and finely ground granular protoplasmic cell contents. Spores are without exception one-celled.

The time elapsing between spore germination on the fruit and the ripening of the first spore crop differs with the season from three or four days to a week. These are the conidia or summer spores.

These conidia, when they fall on an apple, under proper conditions germinate in three or four hours. Just before germination a septum is formed, frequently at or near the middle of the spore, thus producing a two-celled spore. A spore may produce one, two

or even three germ tubes. These germ tubes usually start where a wall forms, one from each end of the spore. The germ tubes grow in length with great rapidity, reaching a length three or four times that of the spore in three-fourths of an hour.

In the process of germination the spores become more or less exhausted of protoplasmic contents by the passage of this substance into the germ tubes. The promycele usually exhibits much denser cell contents than true mycelium; in fact, the latter is normally hyaline, with slightly granular cell contents.

At about the time when the conidia cease to be formed, small black knots appear among the tangled masses of hyphae, looking much like warts. Drops of a yellowish liquid frequently exude from these black bodies. These black knots or masses contain the perithecia of the bitter rot fungus. The perithecia and asci were first described by Clinton in 1902, who proved their connection with the bitter rot fungus by innoculating ascospores into apples and producing bitter rot.

It is still a question as to how the germinating spores find their way through the skin of the apple. Many writers seem to think that the fungus enters through insect punctures and other abrasions of the skin, or through the stomata, but the observations of a number of writers would indicate that a wound is not at all necessary for successful infection and that the fungus most commonly penetrates the unbroken skin.

Once inside the apple, the mycelium branches much and develops rapidly and equally in all directions, downward toward the core as well as laterally. This explains why we have the circular form characteristic of the

spots. Normal mycelium is delicate, hyaline, much septate and constricted at septae. The cell walls are pale, the contents very slightly granular, the granulations usually showing prominently in the vicinity of septae. It grows rapidly and ramifies widely through the substance, is intracellular and branches with great frequency. The strands or threads of mycelium are readily found and penetrate to the center of the specimen. The mycelium is the real cause of decay. New infection may take place by placing this mycelium or a patch containing it against sound fruit. So, infection may take place without the aid of spores if two apples should hang close together. The mycelium is not evanescent, though delicate and persists in decayed specimens.

Apples, if badly attacked, will often shrivel up and may hang on the tree for a year or more. The next summer the mycelium, which has been lying dormant during the winter, will develop conidial spores, which are undoubtedly a source of infection. It is hardly probable that the fruit on the ground causes much damage, for in that position they soon decay. It is an interesting fact that apples badly infected by the fungus are heavier than healthy apples, due likely to the taking up of water.

In 1902 was discovered that missing link in the life cycle of the fungus which apparently has solved the question of how the fungus passes the winter. Students were not satisfied with the belief that the disease was carried over in the mummified fruit, and so after the ravages of 1900 they set to work studying the life history.

It had been repeatedly observed that instead of infection starting in the
(Continued on page 26)

OHIO SHEEP SHEARING FESTIVAL

By Henry W. Vaughn

The third sheep shearing festival was held at the Ohio College of Agriculture on Wednesday, April 14, 1909. The event was given in the new Live Stock Judging Pavilion, where there was splendid space for the shearing and plenty of seating room for the visitors.

Beginning at 9:30 a. m. and continuing throughout the day, an interesting program of contests and exhibitions was carried out, which proved highly interesting to the large number of shepherds present. Small prizes were offered in the various competitions, but these were not sufficient to account for the lively interest with which the contestants entered into the work. The rivalry was friendly, and the best of spirit prevailed throughout.

The awards were based not only upon speed with the shears, but also upon the quality of the work, ability to handle the shears, number of cuts made in the skin of the sheep and the method of handling and holding the sheep. Upon these considerations a score card was constructed to aid the judges in arriving at a satisfactory decision. The form of the card was as follows:

	Points.
Quality of work.....	30
Number of cuts.....	20
Speed	20
Handling shears	20
Handling sheep	10

An exception was made in the fourth event, in which 40 points were given to speed, with a corresponding decrease in points allotted to other requirements.

The first event consisted of shearing two sheep with hand shears and was limited to expert workmen. It was won by G. A. Shaw, of Marengo, with a score of 76. G. B. Ford, of Cambridge, was

second, with 74, and J. T. Rider, of Georgesville, third, with 72. There were six contestants. The second event, which called for shearing two sheep with hand machines, was also won by Mr. Shaw, whose score was 87. Mr. Rider secured second place, with 79, and Mr. Parthemore was third, with 77, from among four contestants.

The third event consisted in exhibition work by an expert with Stewart's Little Wonder Portable Shearing Machine. The work of this machine, as well as the work of other machines on exhibition, aroused considerable interest among the spectators, and each did acceptable service in the hands of men who naturally were skillful in handling a sheep.

There were five entries in the fourth event, and Mr. Ford won the only prize offered, his score being 91. The principal requirement in this contest was speed, and Mr. Ford succeeded in shearing his sheep and tying the fleece in six and three-fourths minutes. This was the best time made during the day in either hand or machine shearing.

Four shearers entered the fifth contest with the power machine. Mr. Rider (89½) was first, Mr. Shaw (89) second, and Mr. D. Lewis (86), of Pataskala, third.

In the college students' competition, one sheep was shorn by each contestant. There were three entries, of whom Heber McClelland (82) finished first, R. D. George (78) second, and G. F. Dickinson (54) third.

Next, a ring of three Cheviots were judged by a class of students before shearing, and then the fleeces were removed to ascertain the correctness of their judgment. It was found that the

students were uniformly correct in their placings.

Several times during the day Mr. M. D. Williamson, of Centerburg, did exhibition hand ring shearing that met with favorable comment from everyone. His shearing was the finest ever seen at an Ohio shearing festival, even though speed is not an outstanding feature of his work.

At the beginning of the afternoon session Professor C. S. Plumb gave a highly interesting and instructive talk on wools. Specimens of American, European and Australian wools were shown in connection with the lecture, and it was pointed out that Australian wool is the best in the world and that Ohio wool is the best in America. It was urged that Ohio shepherds should not rest content in producing the best wool of America, but that they may profit from the Australian, just as Americans in turn would do well to strive toward Ohio's standard in production. Emphasis was laid on the difference between the practice of tying fleeces in Australia and America. The best Australian shippers use a light twine of very good quality, while the Ohioan uses a heavy twine of such poor quality that small pieces of the twine often get into the wool. The cloth made from such wool is greatly injured, because the threads from the twine refuse to take the dye. A sample of cloth was shown illustrating this point and by the use of several exhibits and

illustrations the point was forcibly made that higher standards may be attained in Ohio by giving more attention to cleanliness and tying and that Ohio can thereby be made more famous for her wool than at present.

All in all, the festival proved highly successful, and it is intended to make these events an annual feature at the University. The friendly competitions, the work of the shearing machines, the excellent hand shearing and the talk on wools—all co-operated to inspire the attending shepherds to an attempt at improving Ohio production. All credit is due Professor Plumb for the work of arranging the program and superintending the festival. It is worthy of mention that the prize money offered in the contests was provided by W. E. Minor & Co., of Cleveland, Ohio, and by the Chicago Flexible Shaft Company. The work of the machines on exhibition by the latter company helped to make friends for machine shearing. It is noticeable, however, that skill in handling the shears is almost as important with the machine as it is in hand shearing. Many men have decided against shearing machines too quickly. Had they withheld judgment until they had themselves acquired proficiency in its use, most of them would have been far less vigorous in their denunciation of machine methods. The machine has its place, and the shepherd who has skill to use one may profit thereby.

A PULLED WOOL PLANT

By C. E. Snyder, '09

Few people know anything about the pulled wool industry, much less where the few factories are located. There is such a factory in Columbus, Ohio, and we are going to briefly describe this factory and the methods they follow in the business.

The building is an old wooden one, one hundred and fifty feet long, thirty feet wide and two stories in height. The character of the business is not such that it requires anything fine in the way of a building and it is not at all surprising to see the rather shaky old wooden structure in which the work is done.

Few people realize the wide extent of the use of pulled wool. We don't hear much about it and we don't think of it as being used largely in the manufacture of all kinds of clothing. Every sheep slaughtered yields more or less pulled wool. When we think of this we begin to see that the business is indeed extensive, although it is carried on by comparatively few people.

The great slaughter houses send in hides by the carload. They are spread out flat, salted and piled one on top of another. As they come into the factory they are stored in the basement in about the same way as they are packed in the car. This is where we entered the factory, walking over tons of springy life-like piles of hides. As the hides are wanted they are taken out of the store room on wheelbarrows, piled four feet high and run into the washing and wringing apartment.

The hides are washed by being laid out flat, wool side up, on a sliding table, where they are fed to a cylinder containing many dull knives which beat through the wool and against the skin,

taking out burrs, and over which a stream of water flows.

After washing, the hides are wrung by centrifugal force. About forty of them will go in one of the great wringers. These wringers are like great brass kettles, fitted inside of a stationary cast iron jacket. The inner receptacle containing the hides is whirled at about 2500 revolutions per minute for about seven or eight minutes.

After this process the hides leave this floor and go to the floor above, where they are "painted," graded and piled awaiting the pullers. The composition of this "paint" is not known to people in general. Those handling this chemical wear rubber gloves, as the hands are seriously affected by it if they come in contact with it. The hides lie for one day after "painting" before they are ready to pull. Before pulling the hides are graded very closely by one who understands the business thoroughly.

But one grade of hides is handled at a time. The hides are thrown over an oval horse so that all parts are held out nicely and the wool is pulled with the hands. It is not really pulled, but shoved off. The puller does a slight amount of sorting of the different parts of the fleece.

The wool as soon as taken from the hides is ready for the dryer. The drying is done by means of hot air. The dryer is about twenty feet long, eight feet wide and six feet high. A great endless apron runs through this back and forth, the wool being spread out thin on this. It takes wool about ten minutes to pass through the dryer. The wool is bagged in gummy sacks holding

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THE AGRICULTURAL STUDENT

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M A Y

EDITORIALS

As the school year draws to a close, there arises in the minds of many of our graduates the question, "What shall I do when I am through college?" With some the way is quite clear; circumstances have so outlined their path that there is nothing for them to do but to follow it.

With the great majority of young men, however, this is no small question. Many many times has the young man graduating from the Agricultural College asked himself this question, "Shall I return to the farm or shall I take up teaching, station or government work?"

In answering this question one must consider a number of factors which determine the line of work a man should take up. Some have no farm to which to return, and it would require a great deal more capital than they have to buy and equip one. There are others who have had little or no practical experience on the farm, and to whom farm life holds no attraction. To men in these two classes there is open a wide and unlimited field along the line of college, station or government work.

The third class—and would that there were more in this class—have come here

with no other view in mind than that of going back to the farm when they have finished their college course.

The graduate from an agricultural college should be a farmer, he should put into actual practice the things he has been taught, and show by actual work that agriculture can be made the greatest occupation in the world.

The country needs such men, and the opportunities for success are great. Then let the man with the opportunity start in his life work at once while he is yet full of enthusiasm and eager to put into practice the principles he learned in college. Let him determine that his work shall be an example of thoroughness to the community in which he lives.

AG. SOCIETY MEETING.

The Agricultural Society met Wednesday evening, May 5th, in Townshend Hall. The meeting was called to order by the outgoing President, Mr. Elser, who, after making a few remarks, introduced the new President, Mr. Oyler. The latter having called for the minutes of the April meeting, introduced the speaker of the evening, Professor McCall of the University. The subject of his address was: "What Invention Has Done for Agriculture." The speaker gave a history of the development of important agricultural machinery, mentioning in particular the plow and the grain binder. He made very clear the importance of improved farm machinery, and told his audience that development in this line had by no means reached its zenith.

Near the close of his talk Professor McCall showed some lantern slides of agricultural implements. These, as well as his address, proved very entertaining.

The meeting was well attended and we are glad to say that the Agricultural Society is renewing its interest, and that in the near future will be the leading society in the college.

NEWS NOTES

The committee in charge of the State Corn Show is already making plans for the next show and if these plans are carried out the next show will not only be larger, but more educational than the last.

While the exhibition of samples of corn is of considerable value in arousing interest and inducing study of corn problems, there is a general feeling that the winning samples are not always the best for practical purposes and that too many persons draw wrong conclusions from such exhibitions. It has, therefore, been thought best to continue the yield per acre and cost of producing corn and the farm management contests of last year and to introduce other utility contests in variety testing, plant breeding and a boys' corn growing contest, a uniformity of stand contest and a Grange contest.

In the yield per acre and cost of producing corn contest, 40 credits will be given to the cost per bushel; 30 credits to the yield per acre, and 30 credits to the detail of report. Each report must be accompanied by an affidavit as to the correctness of the records, weights and measurements, and the fairness of the competition. A bushel sample of the corn (70 pounds of ear corn), which will represent the average condition of the corn as to moisture content, uniformity of type, maturity and other qualities, must be sent at the time the crop is harvested, to the Agronomy Department, Ohio State University, to be used as a moisture sample and also as an exhibition sample at the State Show. The yields of all plots in this contest will be reduced to 15 per cent. moisture basis. The plots upon which the contest is based must be at least one acre in area and may be a portion of a larger field

—the cost of production being based on the cost of producing the entire field.

The boys' corn growing contest is open to all boys and girls of the state under 18 years of age, and the trophy cup which is offered by the American Agriculturist will be given to the boy or girl exhibiting the best 10-ear sample of corn grown by the exhibitor. The exhibitor should have as complete charge of the work and do as much of the work as his age will permit. The seed corn may be secured from parents or neighbors, or nearby breeders, but should not be secured from any great distance.

Ohio has been a leader in the production of corn, growing the largest yield per acre of any of the corn states, but most of the other states are making rapid strides in corn improvement, and in order to keep in the lead Ohio must get down to rock bottom, practical studies, such as these contests are intended to stimulate.

There is no time to waste in planning for this work. Do it now.

Address all requests for further information to

V. M. SHOESMITH,
O. S. U., Columbus.

The Ohio State Dairymen's Association will hold another large and important branch meeting May 7 and 8, '09, at Cincinnati. Some time ago a similar meeting was held at Toledo and it was met with such success that other cities have taken up the opportunity whereby the producer and consumer of milk can be brought closer together and both be made to realize the need and value of better dairy products. In connection with the meeting a milk contest and exhibit will also be held and prizes will be awarded to persons receiving highest

score. The College of Agriculture will be represented on the program by Professor Erf and Professor Plumb and Dr. White from the College of Veterinary Medicine. Among the other noted speakers are: 1, Governor Harmon; 2, Clarence B. Lane, Chief of Dairy Division, Department of Agriculture, Washington, D. C.; 3, Professor Van Norman, State College, Pa.; 4, Hon. Renick Dunlap, State Dairy and Food Commissioner; 5, John D. Nichols, President Ohio Dairymen's Association, Cleveland; 6, L. P. Bailey, Tacoma, Ohio; 7, Bert Smith, Delaware, Ohio, and eight leading physicians who are closely connected with the milk supply of our large cities. The 1909 annual report of the State Dairy Association will be out the latter part of June. It will include all the proceedings of the important branch meetings of the association and will be the largest and most extensive report ever published by the association.

The Dairy Department is installing a chutte milk evaporator which has a capacity of 500 pounds of milk per hour, and will be used in the regular work of the department. It was presented to the department by Paul S. Johnson of Cleveland, Ohio, who represents the Hoffman-Ehler Manufacturing Company of Cincinnati.

We are glad to announce that at last the horticultural department is provided with a thoroughly modern spraying equipment. It consists of a 250 gallon tank and tower, and a 3½ H. P. gasoline engine with all the usual accessories. The outfit will be used not only in doing the much needed spraying in the orchards and upon the campus, but will also be used by the classes in horticulture for experimental and demonstration pur-

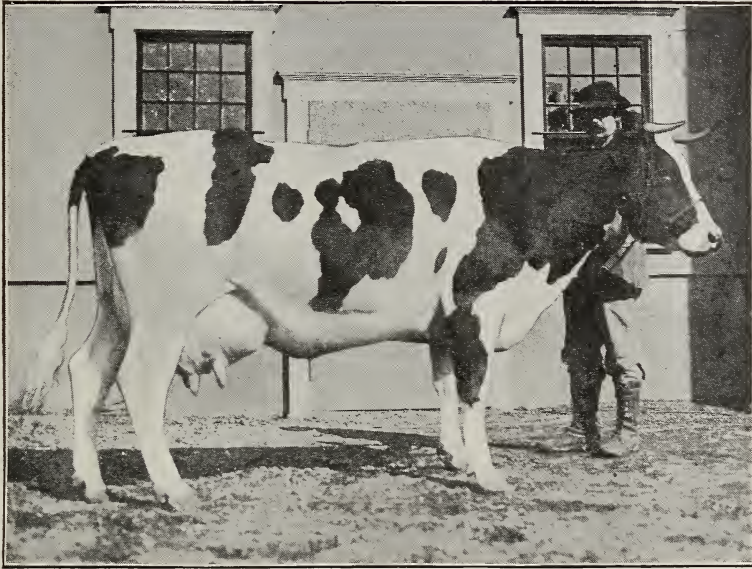
poses. Assistant Professor Davis has been making annual requests for such an outfit for the last five or six years and is taking a certain amount of pardonable pride in finally being able to demonstrate to his classes how modern spraying operations are carried on.

Professor Plum and "Davy" Fyffe, of the Animal Husbandry Department, attended Shugarts and Stubb's sale of Holsteins, April 28, at Marion, Ind. The sale consisted of ninety-three heads of cows and heifers and a number of bull calves. The highest priced cow sold for \$385. Professor Plum bought two young cows for the University, paying \$365 for one and \$260 for the other. These two cows were both sired by the bull, Sir Holden Wayne DeKol, formerly owned by the University. With this addition the University will have four head sired by the same bull and all exceedingly good animals. Quite a number of the animals in the sale were purchased by Ohio breeders. There were also present men from New York, Michigan, Illinois, Wisconsin and Minnesota, as well as from Indiana. On their return the Professor and Mr. Fyffe visited the Proctor farm, south of Trenton, Ohio, where they were looking at fat cattle. From there they went to J. A. Gerlaugh's farm to see his Shorthorns.

The Department of Animal Husbandry recently sold the Hackney stallion, Ohio Gallant, to Dr. A. G. Crockett, of Max Meadows, Virginia.

The Department has also sold three head of Clydesdales to McLay Brothers, Janesville, Wis., and the Clydesdale mare, Pervenche, to Mr. C. E. Jones, Plain City, Ohio.

NEW WORLD'S RECORD BUTTER COW



GRACE FAYNE 2ND'S HOMESTEAD, PURE BRED HOLSTEIN
WORLD'S CHAMPION COW, 35.55 LBS. BUTTER IN 7 DAYS

The milk of the Holstein cow bearing the name above given was tested for butter by a representative of the Cornell University Experiment Station, Ithaca, N. Y., during the latter part of March, 1909, and by the Babcock test showed a yield in seven days of 28.44 lbs. of butter fat. As such records are commonly stated by the Herd-Book Association this yield of butter fat is equivalent to 35.55 lbs. commercial butter at 80 per cent. fat.

This yield exceeds that of any other cow tested under the present scientific systems in use at experiment stations, which are today the only true tests, and is a wonderful example of the capacity and development of cows of this famous breed of dairy cattle. The pre-

vious high record was held by a Holstein cow owned by a Wisconsin breeder, and New York State now claims the championship cow of the world, owned and developed in Syracuse, by Mr. H. A. Moyer.

This cow exhibits to a great degree the characteristic vigor of the Holstein. Her last test was begun when she was six years, twenty-three days old, and showed 5.42 per cent fat. She was the champion four year old of 1907, testing 29.16 lbs. in seven days and 119.22 lbs. in 30 days. As a fine year old she tested 30.55 lbs. in 7 days and 126.68 lbs in thirty days.

F. L. HOUGHTON,
Secretary Holstein-Friesian Ass'n of America.

John Cox, '08, is in Washington, D. C., where he has a position with the Division of Grain Standardization, Bureau of Plant Industry.

J. C. McNutt, '07, now at Cornell University, has been promoted to the position of Assistant Professor in the Animal Husbandry Department.

I. G. McBeth, '07, is with the Division of Soil Bacteriology, Bureau of Agriculture, Washington, D. C.

A. R. Moirt, '08, is working with the Chicago Age Guild, Buffalo Creek Farm.

John F. Lyman comes to the University next fall to take up the position of associate professor in the Department of Soil Fertility. Mr. Lyman was an assistant here four years ago and received his Dr. degree at Yale.

BITTER ROT OF APPLE

(Continued from page 18)

lower branches of the tree and working upward, as would be expected, it would almost invariably appear in the top of the tree first and spread in the shape of a cone downward. It was also observed to start from the same trees each year and to spread outward in all directions from them. These facts repeatedly observed led them to study the tree itself to find if there was no way in which the tree harbored the disease.

These studies resulted in 1902 in Mr. R. H. Simpson discovering blackened depressions of a characteristic appearance on one or more branches at or near the apex of the cone of infected fruit. These had the appearance of cankers and have been known by that name ever since.

These blackened depressions appear on limbs of various sizes, from last year's fruit spurs to limbs three or four

inches in diameter. So far as known, the cankers do not develop on the main trunk. On the limbs, rounded or oblong sooty black sunken spots occur from one to several inches long, which have more or less ragged edges. The entire bark is killed for a considerable distance back, and the dead bark appears cracked and fissured and in some instances broken away. In many cankers regular transverse cracks, caused by the drying out of the bark, are very marked. As the bark dries out it adheres very firmly to the underlying wood, resulting in the shrinkage of the bark and cambium layers, causing a depression of the affected limb. It has been noted, too, that in most cases the cankered spots show the presence near the center of a small branch or of a branch stub. This is interesting, for it leads one to suspicion that possibly infection took place from diseased fruit which grew on such a small branch the previous year. This has not been proven true as yet and is only a conjecture.

Numerous fungus hyphae may be found in the medullary ray cells and the larger vessels, but not enough experimenting has been done as yet to prove that it is always the hyphae of bitter rot. Indeed, it is an unsettled question in the minds of many as to whether the canker is really caused by the bitter rot or is simply associated with or harbored in the canker, which is caused by some other disease.

These are the remedies recommended for controlling the disease:

1. Removal of diseased fruit and mummies.
2. Removal of limb canker.
3. Spraying with fungicides.

The first two are self evident, as removing the source of infection is sure cure. But this is hard to accomplish,

and so fruit growers must resort to fungicides.

Many experiments have been carried out by competent men with various fungicides since 1888, with the result, given briefly, that bordeaux mixture is proven to be the best and most reliable of all, though good results have been obtained from others. The standard bordeaux is still considered the best.

The disease seems to occur rather periodically, some years doing severe damage to the general apple crop and other years doing little harm. In years of severe outbreak it is estimated to destroy \$10,000,000 worth of fruit.

It has been found that some varieties of apples are much more susceptible to the disease than others, but this is somewhat variable with the locality.

A PULLED WOOL PLANT

(Continued from page 21)

about 170 pounds. These sacks are labeled and are ready for shipping. This factory put out thirty-five or forty different grades of wool.

After the wool is removed from the skins these are sent back down to the first floor where they go into a vat containing a lime solution and bran. They remain here five days. The bran prevents acid action on the skins. After the skins come out of the vat they are trimmed, scraped, pickled and graded and are ready for the tanner. It takes a hide twelve days to pass through the factory after it once starts.

The establishment visited is run by Jews almost entirely. It was interesting to note the young brother of the proprietor beginning at the very bottom in the factory and working up that he may some day be ready to run the business. It is a rather odd business which has developed in the past few years.

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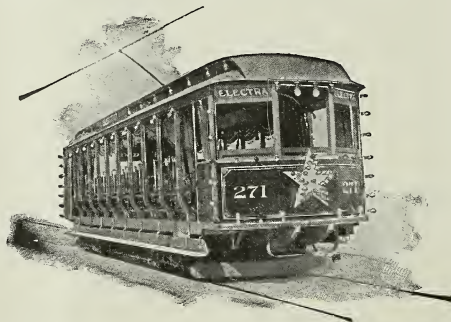
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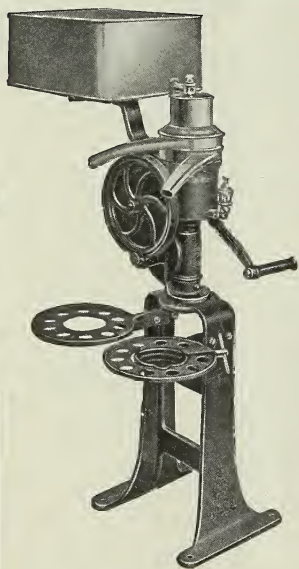
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